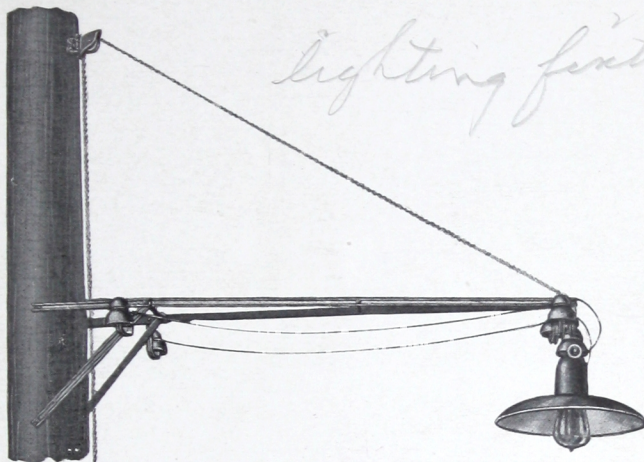


*Pittsburgh*

# Pittsburgh Street Series Lighting System

WITH MAZDA LAMPS



No moving parts

No "series film" cut-outs

No "tub" transformer

No switchboard needed

Efficiency

Power factor

} over 97%

REGULATION—Constant current at  
ALL loads

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## Pittsburgh Transformer Company

Pittsburgh, Pa.

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BULLETIN No. 1160

SUPERSEDING  
BULLETIN NO. 1154







# Pittsburgh Transformer Company

Largest Manufacturers of Transformers exclusively  
in the United States

Pittsburgh, Pa.

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Street Series Lighting

Bulletin 1160

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## The Regulating Principle

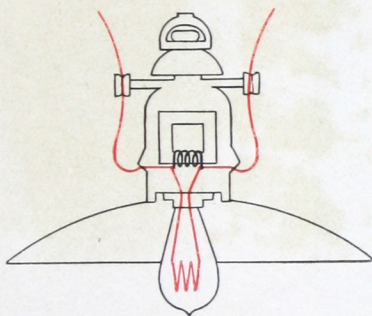


FIG. 1

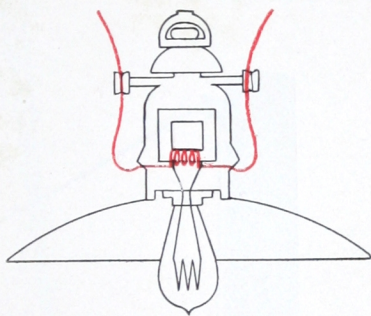


FIG. 2.

**SIMPLICITY**—A street lighting system without a single moving part was the prime idea in developing the Pittsburgh System,—the electrical control and regulation of which must be as simple as the lamp itself was desired and accomplished.

Fig. 1 represents the line current flowing through the lamp filament due to the fact that the resistance of the filament is slightly less than the reactance of the regulating coil.

Fig. 2 represents the line current flowing through the regulating coil when the lamp filament fails.

This action is electrical not mechanical, therefore no moving parts.

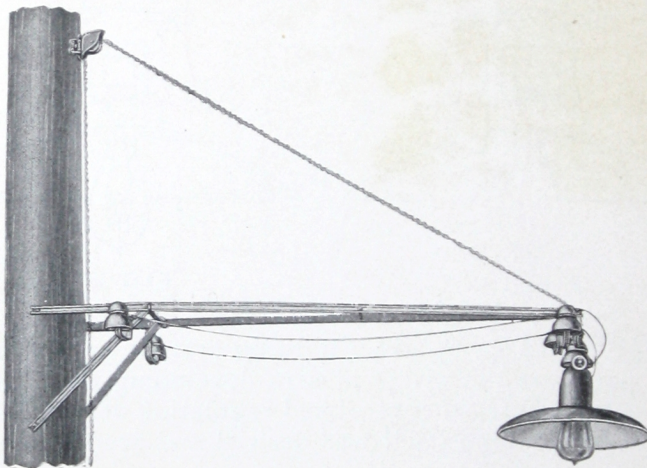
1D 90-B4997 TCF



**THE SITUATION**—For many years street lighting has been about the most unsatisfactory branch of the electrical business.

The value of good street illumination is generally recognized, and the best lighted streets attract the public. Any increase in street illumination means increased traffic and property values which, as is well known, fluctuate with the density of street travel or use. Adequately lighted streets make a deep impression upon visitors to a town and their impressions, favorable or otherwise, are largely influenced by the general scheme of street lighting.

Fundamentally, the street lighting problem resolves itself into a decision as to the intensity of illumination required and the cost. The streets must be considered as long comparatively narrow areas, and to secure proper illumination at a reasonable cost, the intensity of illumination must necessarily be low and uniform.

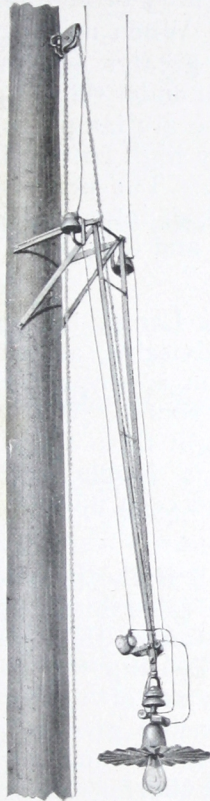


**Pittsburgh Mast Arm**  
Improved design of channel iron galvanized

The costs of street illumination includes the initial investment, the expenditure of energy, cost of maintenance, interest and depreciation of the lamps, plant and all auxiliary equipment. These conditions, therefore, necessitate the use of simple equipment, having few parts to deteriorate, and in this respect the Pittsburgh Automatic Street Series System is ideal.



The old "Open Arcs," superseded by the "Enclosed Arcs," then the "Magnetite Arcs," and now the "Luminous Arcs," shows the time and effort which has been spent endeavoring to produce a street lighting system that would approach the satisfaction given by the Generator and Motor in the power field, the incandescent Lamp in interior lighting and transformers in power transmission.



The arc lamp system of illumination is essentially a "spot light" plan in which the lamps are far apart and give intensely lighted local areas with heavy shadows and dimly lighted sections between lamps. This gives a non-uniform illumination, and if when standing between lamps at the point of minimum illumination, an object can be fairly well seen, the ability to see is materially affected by the arc lamp glare and to the changing light intensity as the person moves along the street.



The Pittsburgh System, however, provides uniform distribution of lower intensity, giving a more practical illumination free from glare. By locating medium sized Mazda Lamps along the street, then at street inter-sections or congested points where traffic is heavier use two or more to a pole, a much more satisfactory and pleasing illumination will be secured than is possible with high intensity glaring arc lamps.

With the increasing use of automobiles and other fast moving vehicles, uniformity of illumination becomes of greatly increased importance. When using arc lamps, it is necessary to suspend them at a greater height, in order to reduce the intensity of illumination under the lamps. In the average street the height at which the arc lamp can be suspended is limited owing to the extremely high cost of installation, tree obstructions, maintenance, etc. The net result is, therefore, a compromise in height and an intensely lighted glaring area with the inevitable shadows and dark spots between lamps, in short a "Spot Light."

The use of Mazda Lamps for lighting of residential districts is particularly advisable, as with any type of lamp the intensity of illumination is proportional to the square of the distance from the light source. With a given distance between lamps and a certain light flux, it will be seen that if the distance between lamps is double, each lamp must have four times the light flux and each mile of street will require twice the energy.

On the other hand if the distance between lamps is reduced to one-half, the same intensity of illumination will be secured with but one-fourth the light flux and one-half the energy expenditure. Bearing the above conditions in mind, it will be seen that the use of high intensity arc lamps spaced far apart, can not possibly give as good distribution at the same operating expense as can be secured by low intensity Mazda lamps spaced at shorter intervals.

For street lighting, lamps are preferably operated in series —i. e.—the same current passes from the source through all the lamps in one group or circuit and back to the source. In the older systems, tub regulators are provided at the station to keep the current constant for each circuit, panel boards and auxiliary apparatus also being necessary. In addition to the cost of equipment, considerable station space must also be provided, arrangements made to install any apparatus or remove defective equipment and an attendant is required to start and manipulate the regulators.



The efficiency and power factor of such a system is low, in fact, seldom exceeds the values given below, and frequently is materially less.

These figures are from official guarantees of a "tub" transformer manufacturer.

KW Sizes	KW Output	EFFICIENCY				POWER FACTOR			
		Full Load	$\frac{3}{4}$ Load	$\frac{1}{2}$ Load	$\frac{1}{4}$ Load	Full Load	$\frac{3}{4}$ Load	$\frac{1}{2}$ Load	$\frac{1}{4}$ Load
3	3	91.5	89.5	85.5	75.5	80.8	62.8	43.0	23.0
5	5	92.5	90.5	86.5	78.0	82.0	63.0	43.0	23.0
10	10	93.5	92.0	88.5	81.5	82.5	63.2	43.2	23.0
15	15	94.5	93.0	90.5	84.0	83.2	63.2	43.2	23.2
20	20	95.0	93.8	91.0	85.0	83.6	63.5	43.4	23.2
25	25	95.2	94.0	91.5	85.5	83.8	63.5	43.4	23.2

Note the low efficiency and poor power factor, especially at  $\frac{3}{4}$ ,  $\frac{1}{2}$ , and  $\frac{1}{4}$  load.

### Complications of Arc Lamps

Where arc lamps are used in conjunction with tub regulators, the complications are correspondingly increased, as each lamp must be provided with a mechanism to hold the arc length constant and secure the proper voltage at the arcs. An inspection of the common forms of arc lamps discloses a complicated mechanism difficult to adjust, and subject to high depreciation. The later types of flame lamps are even more complicated, and the maintenance charges correspondingly increased.

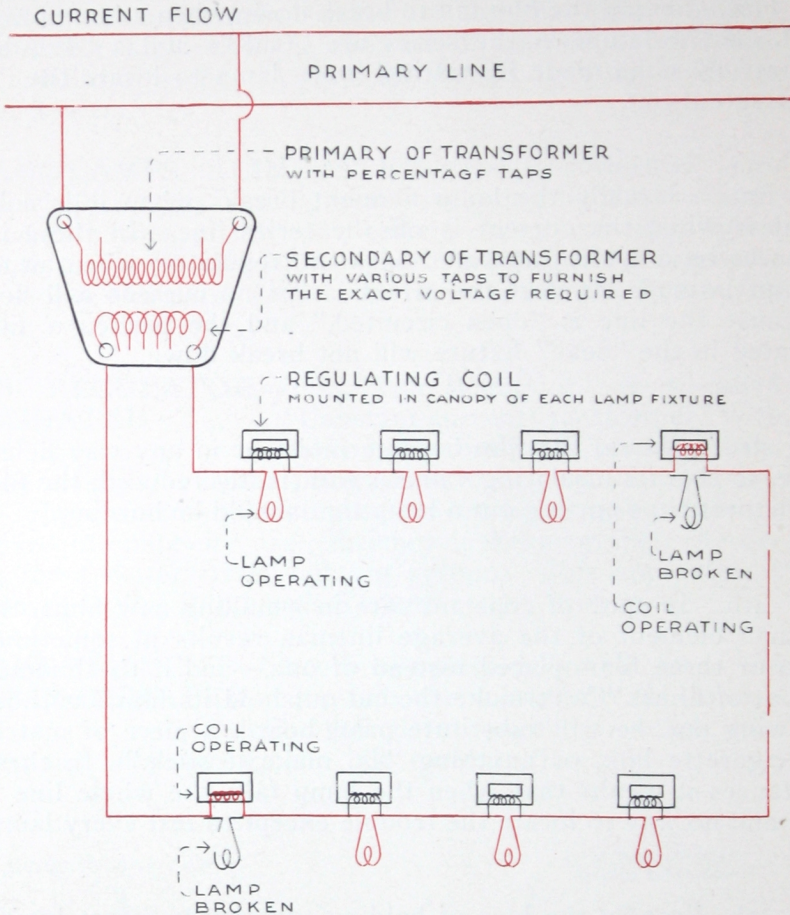
**THE RESULT**—The Arc-Lamp System fails to satisfy the public and the "tub-regulator," or so called movable-coil-constant-current regulator-transformer system, fails to satisfy the Central Station.

**THE PROOF**—The business, and more especially the residential sections, suburban streets, parks, drives, roadways, bridges, and the smaller towns in the United States which should be electrically lighted compared with those which are actually lighted shows more clearly than argument the limitations of the Arc-lamp.



## The Pittsburgh Series System

### Diagrammatic Plan of Operation



**TRANSFORMER**—To supply the voltage necessary for the lamps operating in series a simple constant potential transformer is furnished, connected to the primary line, arranged with a secondary wound for a wide range of voltages.

This voltage range permits more lamps to be added to the system up to the highest voltage tap.

This system has the advantage of a multiple system in that once having secured the exact voltage required no further adjustment or attention is required. The regulation is provided at the lamp—not at the Power House.



## The Pittsburgh Series System

**REGULATING PRINCIPLE**—Around each lamp is connected a regulating coil as shown on page 8. Regulation is thus secured by the well known principle of diverting the current around the lamp when it fails. The regulating coil has a reactance practically equivalent to the lamp filament resistance, so that when the lamp is “out” the reactance of the coil automatically takes the place of the lamp. When the lamp is replaced the coil automatically cuts out. This “Cutting-in” and “Cutting-out” of the coil is an inductive action,—not mechanical,—therefore, is accomplished without any moving parts.

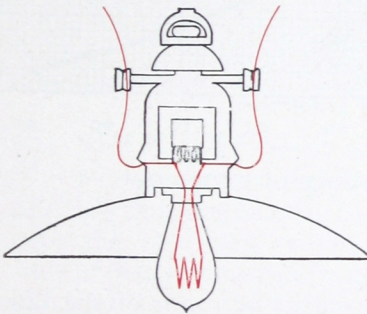


FIG. 1

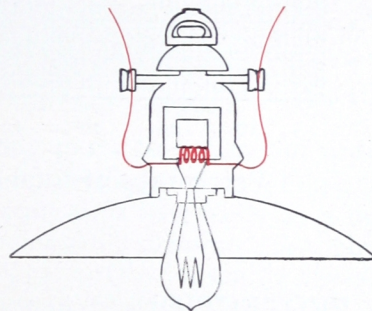


FIG. 2.

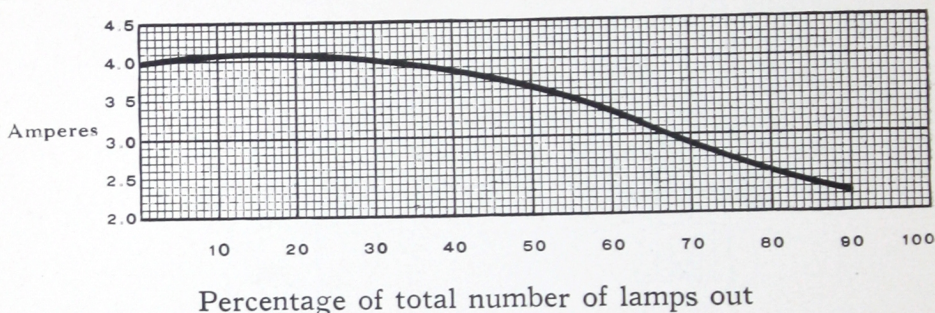
The coil cannot fail to operate short of a severe accident. It is “tied in” to the series line, as much a solid part of the system as the line itself. Compare this inductive principle with the mechanical action of a series-film-cut-out. It is seen that the series-film-cut-out is NOT a part of the system until the lamp breaks,—and must depend upon a mechanical movement to make it do its work as a part of the system.



## REGULATION

The regulation of the system is practically perfect. The system provides constant current under all normal conditions. 10 per cent, 20 per cent, or even 30 per cent of the lamps of the entire system may be out without appreciably affecting the regulation of the system.

### Regulation Curve



**PROTECTION**—When 40 percent or more of the lamps go out it means that a serious accident or trouble has caused such failure. The important thing then is,—**PROTECTION** to the remaining lamps. The Pittsburgh System provides that with 40 percent of the lamps out a **RISE** in current is impossible. Instead, the current curve droops slightly,— and with an increasing percentage of outages the current decreases proportionately. This is not regulation, but is something far more important at that moment, viz., **PROTECTION**.

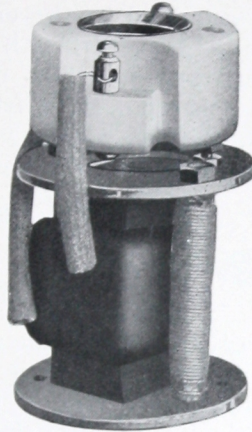
A system suddenly paralyzed with 40-50 or 60 percent of its lamps out needs **PROTECTION**, not regulation.



## **Construction Details of the Pittsburgh System**

### **Regulating Coil**

The Pittsburgh Regulating Coils are wound on a core of High Silicon Steel, the complete unit is vacuum treated and impregnated with a weatherproof compound so that it cannot possibly be affected, even under the worst weather conditions.

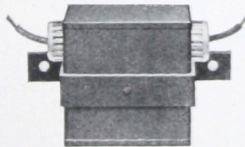


**Regulating Coil and Lamp Receptacle**

### **SIMPLICITY—no moving parts to get out of order**

For street lighting fixtures, as shown on pages 15, 16, 17, and 18, the Regulating Coil and lamp receptacle as a unit fits into the cast iron canopy over each reflector. The complete unit is easily removed from the canopy by loosening two screws. Each unit is tested at 5000 volts to ground.

### **Regulating Coil (Separately Mounted)**



**Regulating Coil mounted in Sheet Steel Case with Strap Hanger.  
Weatherproof**

For special arrangements of street illumination, such as ornamental posts, or where street fixtures are already installed, the coil is mounted in a sheet steel case which can be placed inside the pole, or on the outside of the pole, separate and apart from the lamp fixture.



## Transformers

To supply the desired voltage for the number of lamps in series, a weatherproof outdoor (or in-door) core type constant potential transformer is used.

**FLEXIBILITY**—These transformers are listed and described on page 23. The secondary winding can be wound for any number of lamps in series. The secondary windings are provided with a number of voltage taps, so that at any time additional lamps may be added to the circuit up to the maximum voltage for which the transformer is wound.

These transformers are specially designed to permit a range of 30 percent in 2 percent steps from minimum to maximum voltage. Thus taking the lowest voltage as normal (100 percent) the following steps are possible:

100 per cent.	110 per cent.	120 per cent.
102 per cent.	112 per cent.	122 per cent.
104 per cent.	114 per cent.	124 per cent.
106 per cent.	116 per cent.	126 per cent.
108 per cent.	118 per cent.	128 per cent.
		130 per cent.

This permits a very fine adjustment of voltage for the series line, and also a liberal increase in the number of lamps which can be added above "normal." These various voltage connections are made inside the transformer case, easily and safely.



**Pittsburgh Transformer**

**SIMPLICITY**—Once determine the exact voltage required for the number of lamps in the series, no further adjustments are necessary, and as the transformer has no moving parts, it requires no care or attention in throwing on or off the series street lamps.

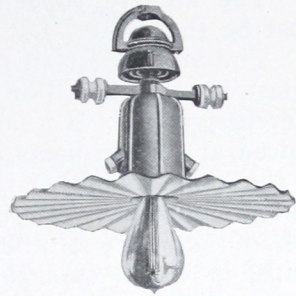
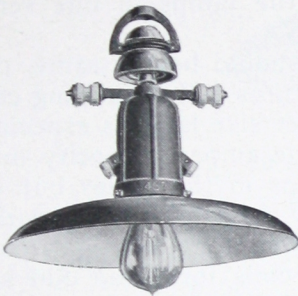
**WEATHERPROOF**—These transformers if desired may be installed outdoors at any point along the primary line. In some instances this may save running separate long lines from the power house to the distributing center for the street lighting.



## Pittsburgh Reflectors

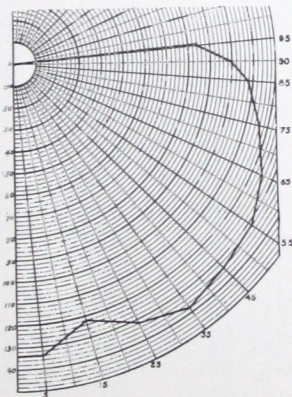
When a reflector is placed over an illuminant it is to so redirect the light from the illuminant in that manner which will best serve the particular requirement.

**DESIGN**—Pittsburgh Reflectors are scientifically designed for street lighting, and the adjustment of the reflectors with relation to the lamp filament has been nicely calculated to diffuse the maximum illumination at the proper angle below the horizontal.

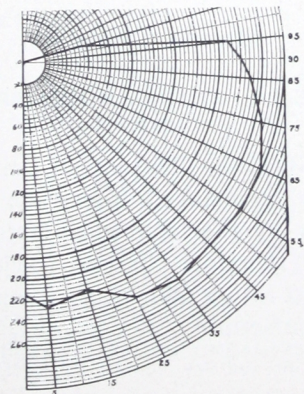


**GLAZING**—The quality of the glazing, together with the design effects a better distribution of light than is given by any other reflector for street lighting. The enamel on Pittsburgh Reflectors is a tin glass, not porcelain glazed.

**BEADING**—The edges of all Pittsburgh Reflectors are specially beaded and enameled, preventing rust so commonly noticed on many street reflectors.



Illumination Curve  
Pittsburgh Reflector  
with 350 c. p. Mazda Lamp



Illumination Curve  
Pittsburgh Reflector  
with 80 c. p. Mazda Lamp



## Special Notes on the Pittsburgh System

In ordering please specify each of these items giving catalogue number.

- 1st. Step-down (or Step-up) Transformer with variable voltage taps, which can be mounted on a pole outdoors.
- 2nd. Lamp fixtures and Reflectors.
- 3rd. Lamp fixture Support, (Mast arms.)

## Lamps

The ampere capacity of all of the lamps in one series must be the same.

The voltage of all of the lamps should be the same, if it is desired to make all of the street fixtures and regulating coils interchangeable. If a larger or smaller size lamp is especially desired at certain parts of the line, the ampere capacity must be the same as all of the other lamps in the series but the voltage may vary. It is then necessary to design the regulating coil to take care of the voltage desired for these particular lamps, in which case the regulating coils for these odd size lamps will not be interchangeable with any other voltage lamp.

The sum of the voltages of all of the lamps must equal the voltage of the circuit to which they are connected. For example if the voltage of the lamps in a circuit total, say 980 volts, then the proper tap on the step-down transformer must be connected to give this voltage.

## Mazda Lamps

N. E. LA. RATING, NOVEMBER,  
1912.

NOTE:—This table of rating may be changed from time to time by the lamp manufacturers, therefore, please consult latest rating table of your lamp manufacturer.

Amps.	Candle Power	Watts.	Volts.
3.5	32	39.0	11
	40	48.0	14
	60	70.8	20
	80	93.6	27
4.0	32	40.3	10
	40	48.8	12
	60	70.8	18
	80	92.8	23
	100	114.0	29
	200	226.0	57
	350	396.0	99
5.5	32	42.3	8
	40	50.8	9
	60	70.8	13
	80	91.2	17
	100	112.0	20
	200	220.0	40
	350	385.0	70
6.6	32	44.8	7
	40	52.8	8
	60	70.8	11
	80	88.8	13
	100	108.0	17
	200	210.0	32
	350	368.0	56
7.5	32	47.4	6
	40	54.4	7
	60	70.8	9
	80	87.2	12
	200	206.0	28



**Pittsburgh Fixture, Type A.****20 inch Reflector—Smooth Oval**

**DESIGN**—This fixture and reflector is designed for graceful and quiet ornamental appearance. It is recommended especially for its simplicity,—durability against weather conditions,—ease of cleaning, less likely to collect dirt,—simply a plain smooth reflector without fantastic shape or fancy flutes.

Note the slanting weatherproof porcelain bushings at each side of the canopy. The series line is thus entirely supported on porcelain and the wires are prevented from coming in contact with the fixture. Heavy brass screws with jamb nuts fasten reflector to canopy.

**Pittsburgh Fixture, Type A.****LIST PRICES**

Catalog No.	Lamp Size	List Price	List Price
	Candle Power	60 Cycle	25 Cycle
500	32	\$9.60	\$11.30
501	40	9.60	11.30
502	60	10.50	12.30
503	80	10.50	12.30
504	100	10.50	12.30
505	200	14.90	17.00
506	350	15.90	18.20

Above data on Lamp Size taken from November, 1912, rating on Mazda Lamps by National Electric Lamp Association. Any slight variation in rating will make no difference in prices of Pittsburgh Fixtures.

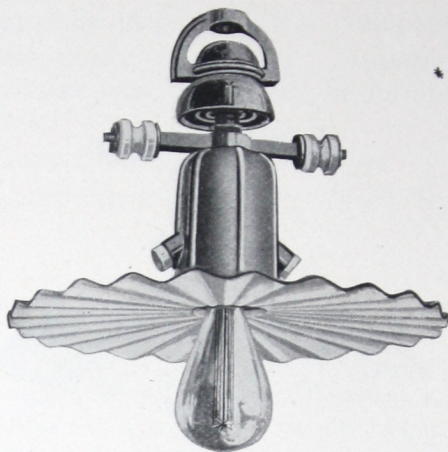
List prices cover fixtures complete, including Regulating Coil and large Edison base lamp receptacle, as per above illustration. Lamps are not included in List Prices.

Always specify exact candle power, wattage and amperage of lamps to be used when ordering Pittsburgh Fixtures.

Also specify cycles of circuit on which fixtures are to operate.

All fixtures, hangers and suspensions carried in stock threaded  $\frac{3}{4}$  inch iron pipe thread. Any other threading is special and will have to be made to order.



**Pittsburgh Fixture, Type B.****20 inch Reflector—Single Radial Wave**

**DESIGN**—This Fixture is identical with the Pittsburgh Fixture Type A,—except that the reflector is of fluted design.

The light distribution and illumination curve is slightly different from the smooth oval reflector, Type A, and where lamps must be hung very low this type of reflector is very efficient.

The edges are protected by a heavy beading of steel,—glass enameled to prevent rust. All Pittsburgh Reflectors have beaded edges. This feature is very important, for after months and years of outdoor weather conditions, most reflectors show “rusty” around the periphery of the reflector.

**Pittsburgh Fixture, Type B.****LIST PRICES**

Catalog No.	Lamp Size	List Price 60 Cycle	List Price 25 Cycle
	Candle Power		
507	32	\$ 9.60	\$11 30
508	40	9.60	11.30
509	60	10.50	12.30
510	80	10.50	12.30
511	100	10.50	12.30
512	200	14.90	17.00
513	350	15.90	18.20

Above data on Lamp Size taken from November, 1912, rating on Mazda Lamps by National Electric Lamp Association. Any slight variation in rating will make no difference in prices of Pittsburgh Fixtures.

List prices cover fixtures complete, including Regulating Coil and large Edison base lamp receptacle, as per above illustration. Lamps are not included in List Prices.

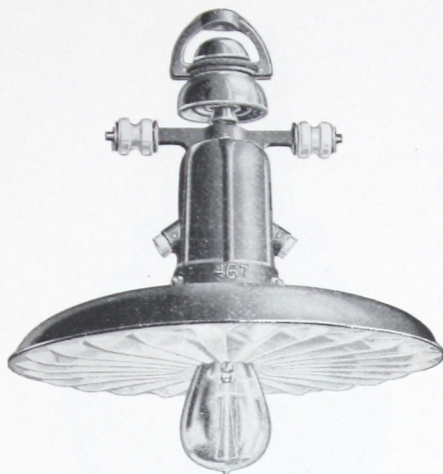
Always specify exact candle power, wattage and amperage of lamps to be used when ordering Pittsburgh Fixtures.

Also specify cycles of circuit on which fixtures are to operate.

All fixtures, hangers and suspensions carried in stock threaded  $\frac{3}{4}$  inch iron pipe thread. Any other threading is special and will have to be made to order.



## Pittsburgh Fixture, Type C.



20 inch Reflector—Double Radial Wave

**DESIGN**—The Pittsburgh Fixture Type C is identical with the Type A and Type B,—except the reflector. The reflector is a combination of the smooth oval reflector and the single radial wave reflector used on fixtures A and B, making a double reflector glass enameled on all surfaces.

This fixture and 20" double reflector presents a heavy rugged appearance, strong and durable.

Where the utmost in size and appearance is desired, this fixture fulfills the requirements.

## Pittsburgh Fixture, Type C.

## LIST PRICES

Catalog No.	Lamp Size	List Price 60 Cycle	List Price 25 Cycle
	Candle Power		
514	32	\$ 11.10	\$ 12.80
515	40	11.10	12.80
516	60	12.00	13.80
517	80	12.00	13.80
518	100	12.00	13.80
519	200	16.40	18.50
520	350	17.40	19.70

Above data on Lamp Size taken from November, 1912, rating on Mazda Lamps by National Electric Lamp Association. Any slight variation in rating will make no difference in prices of Pittsburgh Fixtures.

List prices cover fixtures complete, including Regulating Coil and large Edison base lamp receptacle, as per above illustration. Lamps are not included in List Prices.

Always specify exact candle power, wattage and amperage of lamps to be used when ordering Pittsburgh Fixtures.

Also specify cycles of circuit on which fixtures are to operate.

All fixtures, hangers and suspensions carried in stock threaded  $\frac{1}{4}$  inch iron pipe thread. Any other threading is special and will have to be made to order.



**Pittsburgh Fixture, Type DE.**

**DESIGN.** Used in cities where tungsten street lighting is replacing arcs and it is desired to maintain the general scheme of "arc-lamp appearance." In smaller cities and towns it may often be desired to light the main streets with this type of fixture and use the reflector type in the residence streets.

This type of fixture is very well adapted to mounting on ornamental poles.

**Pittsburgh Fixture, Type DE.**

List Prices do not include ball globes

**LIST PRICES**

Catalog No.	Lamp Size.	List Price 60 Cycle	List Price 25 Cycle
	Candle Power		
523	32	\$ 9.60	\$11.30
524	40	9.60	11.30
525	60	10.50	12.30
526	80	10.50	12.30
527	100	10.50	12.30
528	200	14.90	17.00
529	350	15.90	18.20

Above data on Lamp Size taken from November, 1912, rating on Mazda Lamps by National Electric Lamp Association. Any slight variation in rating will make no difference in prices of Pittsburgh Fixtures.

List prices cover fixtures complete, including Regulating Coil and large Edison base lamp receptacle, as per above illustration. Lamps are not included in List Prices.

Always specify exact candle power, wattage and amperage of lamps to be used when ordering Pittsburgh Fixtures.

Also specify cycles of circuit on which fixtures are to operate.

All fixtures, hangers and suspensions carried in stock threaded  $\frac{3}{4}$  inch iron pipe thread. Any other threading is special and will have to be made to order.



### Pittsburgh Mast Arm

The Pittsburgh Mast Arm is hinged near the pole permitting the fixture and lamp to be dropped for inspection, cleaning or renewal.

The ornamental appearance of this arm, its rugged strength and comparative light weight makes it an improvement over any similar hanger. It gives to Mazda lighting the general appearance of an arc lamp installation, but with the added grace and appearance.

The Pittsburgh Mast Arms are Galvanized finish, (galvanized after forming.) The advantage of the Galvanized finish is obvious—doing away with the necessity of painting and repainting. The galvanizing will last twenty years under ordinary climatic conditions.

### Pittsburgh Mast Arms

#### LIST PRICES

##### Galvanized

Catalog No.	Length	List Price
350	6 ft.	\$ 3.70
351	8 ft.	4.00
352	10 ft.	4.60
353	12 ft.	4.95

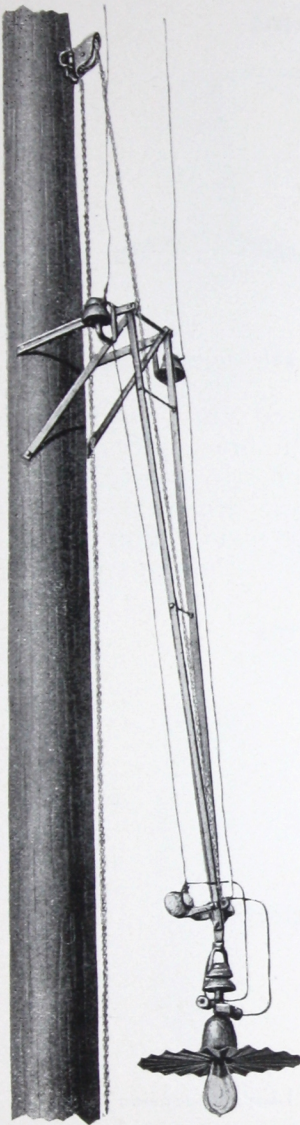
Prices include arm, insulator supports and loop for supporting lamp fixture. Prices **do not** include insulators, chain, pulley or lamp fixture and reflector.

#### Accessories to Mast Arms

Each Mast Arm requires four insulators for supporting the line wires. Galvanized chain or rope and pulley for raising and lowering the arms.

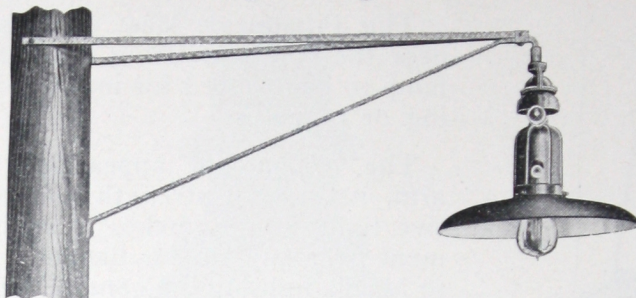
#### LIST PRICES

Insulators, Porcelain glazed, 5000 Volts... \$10.00 per hundred  
 Heavy Swivel type pulley..... 90 each  
 Oneida Galvanized No. 1 Chain 500 ft. reels 4.50 per 100 ft.





### Pittsburgh Hanger Arms



**Pittsburgh Hanger Arm Channel Iron galvanized  
Triple braced**

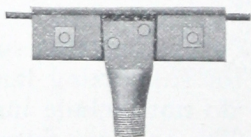
Ornamental in appearance, galvanized finish, and constructed of channel iron. The three point brace gives great strength, making this arm much better and stronger than the common iron pipe goose neck. Goosenecks are weak at the point where the pipe screws into the pole plate. This Pittsburgh Arm is designed as a simple rugged method of support.

### Pittsburgh Hanger Arms

#### LIST PRICES Galvanized

Catalog No.	Length	List Price
521	4 ft.	\$2.20
522	6 ft.	3.00

### Various Pittsburgh Supports



**Center Span Suspension**

#### LIST PRICE Galvanized

Catalog No.	List Price
380	\$ .70



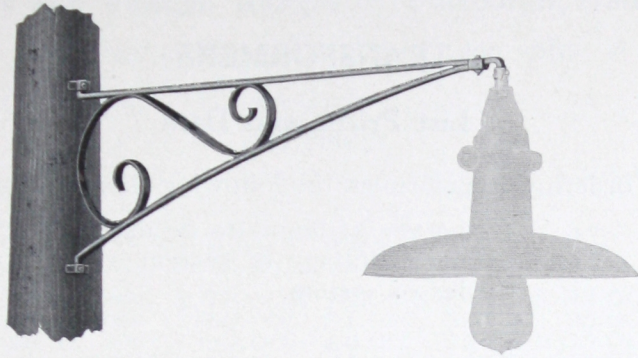
**Loop Suspension**

#### LIST PRICE Galvanized

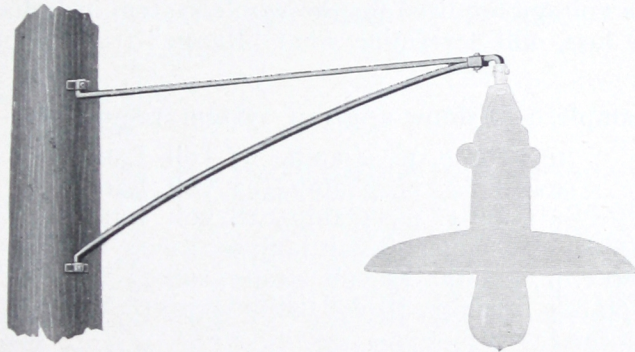
Catalog No.	List Price
382	\$ .40

All fixtures, hangers and suspensions carried in stock threaded  $\frac{3}{4}$ " iron pipe thread. Any other threading is special and will have to be made to order.



**Pittsburgh Hanger Arm (Scroll)**

Ornamental in appearance, Galvanized finish. Constructed of channel iron and braced so it is many times stronger than a common iron pipe gooseneck.

**Pittsburgh Hanger Arm (Plain)**

**LIST PRICES**  
Galvanized

Catalog No.	Style	Length	List Price
372	Scroll	4 ft.	2.20
373	Scroll	6 ft.	2.90
374	Plain	4 ft.	1.35
375	Plain	6 ft.	1.95

All fixtures, hangers and suspensions carried in stock threaded  $\frac{3}{4}$ " iron pipe thread. Any other threading is special and will have to be made to order.



## TRANSFORMERS

### List Prices and Data

In ordering transformers the following should be specified:

Amperage of lamps to be used.  
Primary Voltage of system.  
Cycles of system.

### How to determine the size of Transformer required

Multiply the **voltage** of the lamps by the number of lamps in series which gives the total voltage required for the lamps. To this total add for line drop 5 percent or  $7\frac{1}{2}$  percent or 10 percent. Usually 10 percent is safe.

The voltage required for the whole system including lamps and line loss, will determine what "Range" transformer is required.

Example:—Assume a given system requiring:

10—100 c. p., 4 amp., 29 volt Lamps	
40—80 c. p., 4 amp., 23 volt Lamps	
30—60 c. p., 4 amp., 18 volt Lamps	
10—100 c. p., 4 amp., 29 volt lamps	$= 10 \times 29 \text{ V.} = 290 \text{ Volts}$
40—80 c. p., 4 amp., 23 volt lamps	$= 40 \times 23 \text{ V.} = 920 \text{ Volts}$
30—60 c. p., 4 amp., 18 volt lamps	$= 30 \times 18 \text{ V.} = 540 \text{ Volts}$

Total volts required for lamps	$=$	1750 Volts
Add 10 percent for line loss	$=$	175 Volts

Total volts required for system		1925 Volts
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This voltage will require a Range J Transformer and the transformer will have capacity to take care of about 25 percent more lamps should it be desired to add these later.



## List Prices and Voltage Ranges of Pittsburgh Transformers

Primary either 1100 volts or 2200 volts.

60 Cycle

### LIST PRICES

Cat. No.	Range	Voltage		AMPERES				
		Taps on each trans. to give all voltages from min. to max. in 2% steps.		3.5	4.0	5.5	6.6	7.5
530	A	200	to 260	\$ 78.00	\$ 79.00	\$ 84.00	\$ 92.00	\$ 98.00
531	B	270	to 350	80.00	81.00	86.00	95.00	102.00
532	C	360	to 470	82.00	84.00	92.00	100.00	108.00
533	D	480	to 625	88.00	94.00	104.00	130.00	142.00
534	E	630	to 820	92.00	100.00	114.00	150.00	160.00
535	F	830	to 1080	115.00	125.00	150.00	190.00	200.00
536	G	1090	to 1420	145.00	156.00	185.00	240.00	250.00
537	H	1430	to 1860	185.00	200.00	240.00	300.00	315.00
538	J	1870	to 2430	220.00	250.00	310.00	372.00	410.00
539	K	2440	to 3170	250.00	285.00	355.00	425.00	470.00
540	L	3180	to 4135	285.00	330.00	405.00	485.00	541.00

25 Cycle

### LIST PRICES

Cat. No.	Range	Voltage		AMPERES				
		Taps on each trans. to give all voltages from min. to max. in 2% steps		3.5	4.0	5.5	6.6	7.5
541	A	200	to 260	\$ 97.00	\$ 98.00	\$105.00	\$115.00	\$122.00
542	B	270	to 350	100.00	101.00	107.00	119.00	127.00
543	C	360	to 470	102.00	104.00	115.00	125.00	135.00
544	D	480	to 625	110.00	116.00	130.00	162.00	177.00
545	E	630	to 820	115.00	123.00	142.00	187.00	200.00
546	F	830	to 1080	144.00	154.00	187.00	237.00	250.00
547	G	1090	to 1420	181.00	192.00	231.00	300.00	312.00
548	H	1430	to 1860	231.00	246.00	300.00	375.00	394.00
549	J	1870	to 2430	275.00	305.00	387.00	465.00	512.00
550	K	2440	to 3170	312.00	347.00	443.00	531.00	587.00
551	L	3180	to 4135	356.00	400.00	506.00	606.00	676.00

Necessary oil and one pair of 2200 Volt Primary fuse blocks furnished with each transformer. Hanger irons are furnished with the sizes adaptable to pole mounting.

Transformers of any other primary voltage supplied and prices quoted on application.

We are prepared to make the Pittsburgh Automatic Mazda Street Series Lighting System for operation on 133 Cycle Circuits.





Pittsburgh Power Transformers

Mill Type  
Heavy Duty  
100 per cent. Overload

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## Pittsburgh Transformer Company

Largest Manufacturers of Transformers exclusively  
in the United States

Pittsburgh, Pa.



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**Pittsburgh Transformer**

If you wish to have a complete file of transformer literature, the following publications will be sent on request:

- Bulletin 1092**    New Pittsburgh Transformer
- Bulletin 1093**    Small High Voltage Transformers
- Bulletin 1100**    New Pittsburgh Fuse Blocks
- Bulletin 1157**    Pittsburgh Bell Ringer
- Bulletin 1158**    Repairing High-Voltage Lines While in Service
- Bulletin 1159**    Pittsburgh Mazda Transformer
- Bulletin 1160**    Pittsburgh Street Series Lighting System

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**Pittsburgh Transformer Company,**  
Pittsburgh, Pa.



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